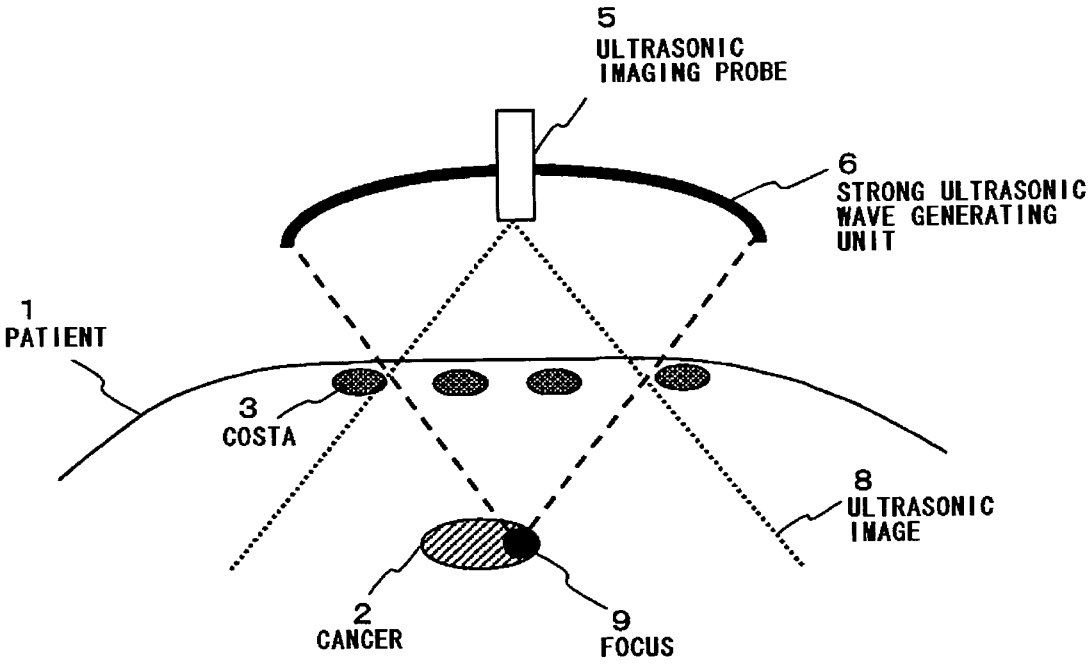
5
ULTRASONIC
IMAGING PROBE
6
STRONG ULTRASONIC
WAVE GENERATING
UNIT
1
PATIENT
3
COSTA
8
ULTRASONIC
IMAGE
2
CANCER
9
FOCUS

FIG. 1A

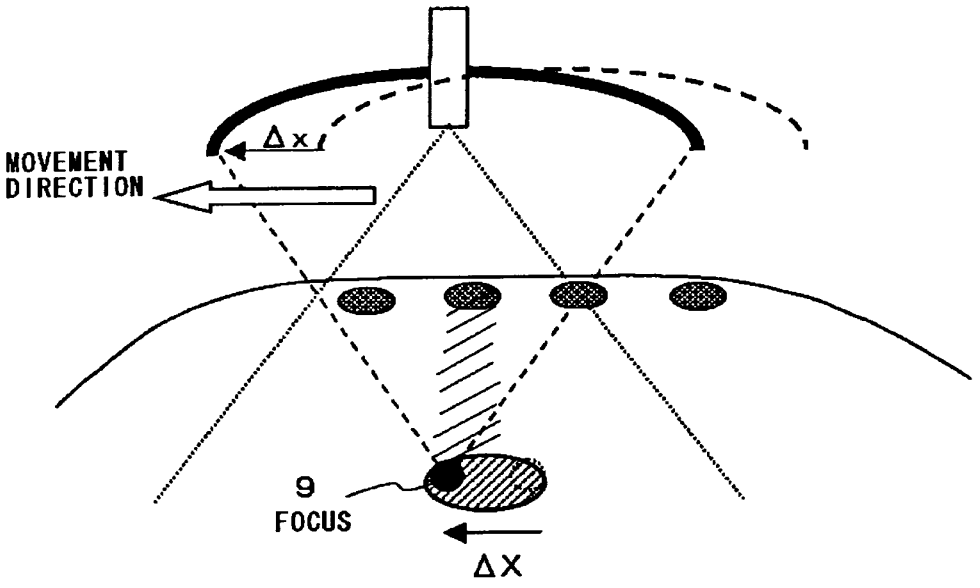

FIG. 1B

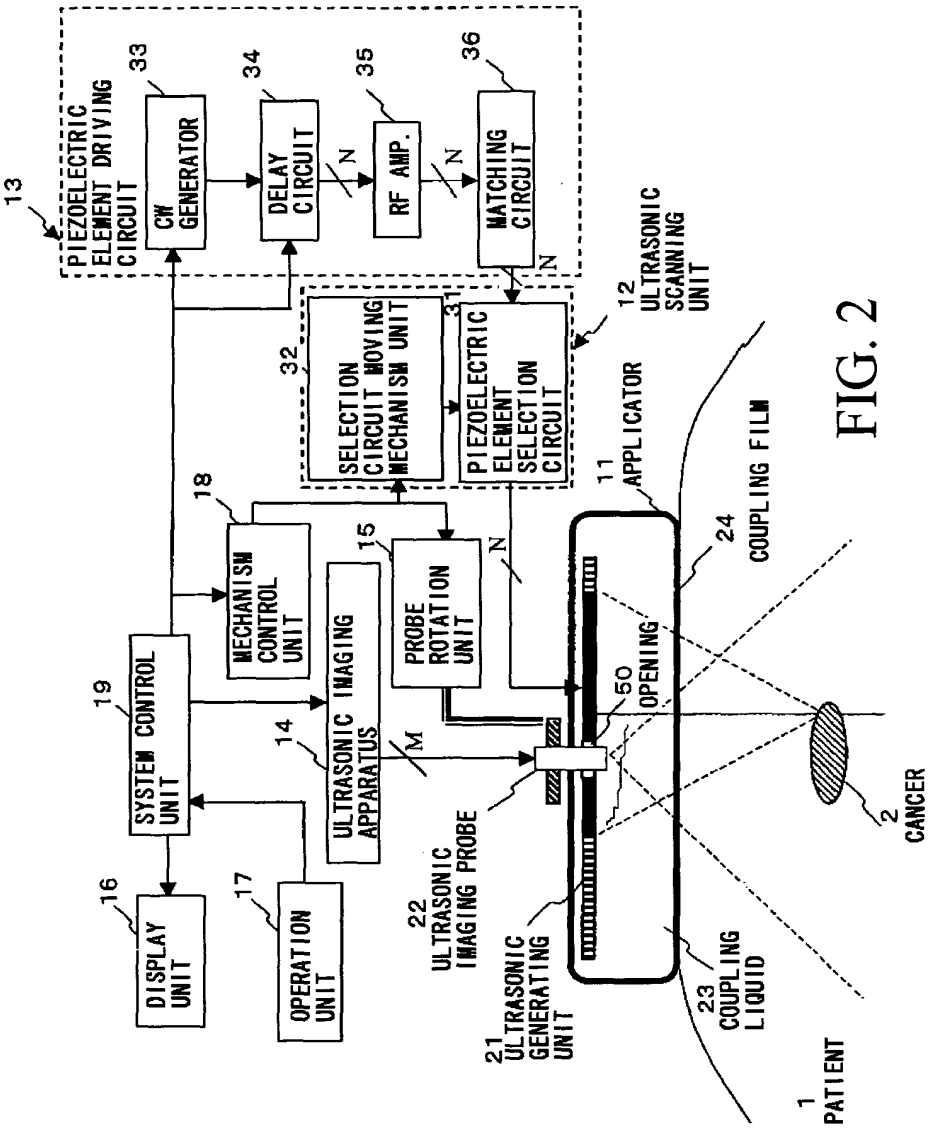
13
PIEZOELECTRIC ELEMENT DRIVING CIRCUIT
33
CW GENERATOR
34
DELAY CIRCUIT
35
RF AMP.
36
MATCHING CIRCUIT
N
12
ULTRASONIC SCANNING UNIT
32
SELECTION CIRCUIT MOVING MECHANISM UNIT
31
PIEZOELECTRIC ELEMENT SELECTION CIRCUIT
11
APPLICATOR
24
COUPLING FILM
18
MECHANISM CONTROL UNIT
15
PROBE ROTATION UNIT
50
OPENING
19
SYSTEM CONTROL UNIT
14
ULTRASONIC IMAGING APPARATUS
M
2
CANCER
16
DISPLAY UNIT
17
OPERATION UNIT
22
ULTRASONIC IMAGING PROBE
21
ULTRASONIC GENERATING UNIT
23
COUPLING LIQUID
1
PATIENT

FIG. 2

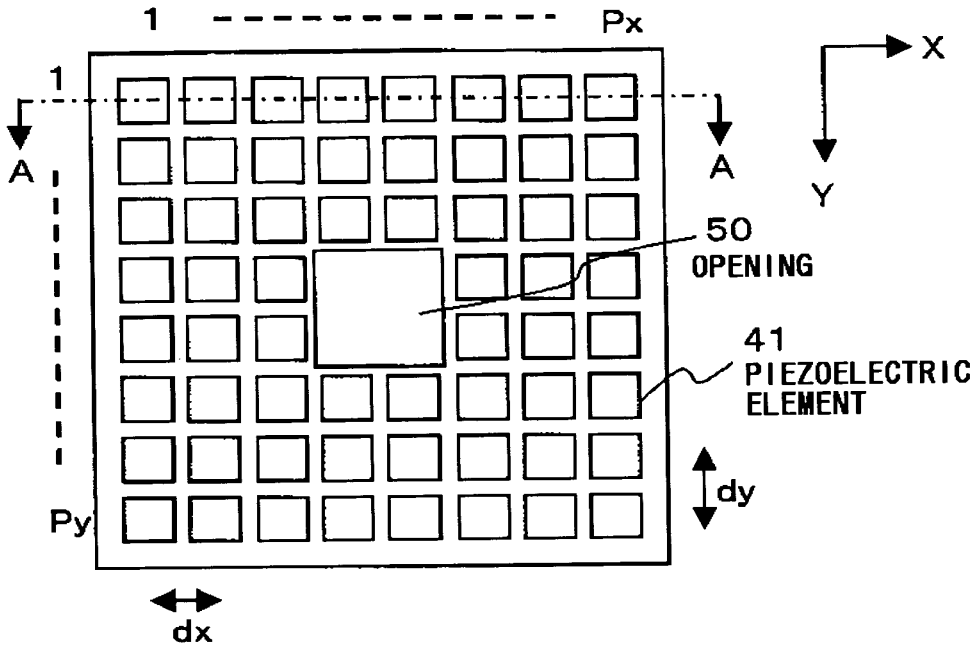

FIG. 3A

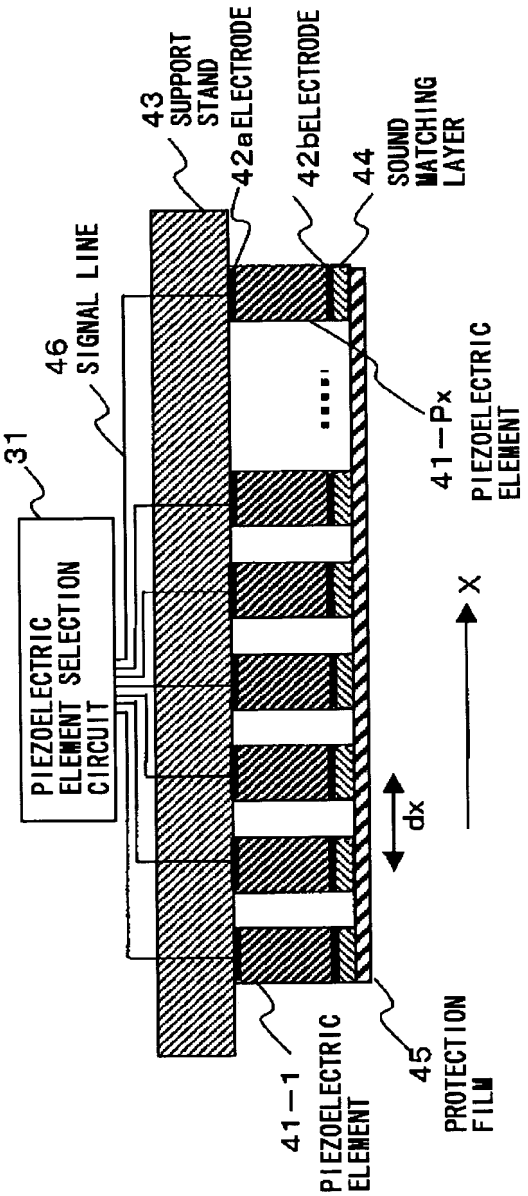
43
SUPPORT STAND
42a ELECTRODE
42b ELECTRODE
44
SOUND MATCHING LAYER
46
SIGNAL LINE
31
PIEZOELECTRIC ELEMENT SELECTION CIRCUIT
41—Px
PIEZOELECTRIC ELEMENT
X
dx
41—1
PIEZOELECTRIC ELEMENT
45
PROTECTION FILM

FIG. 3B

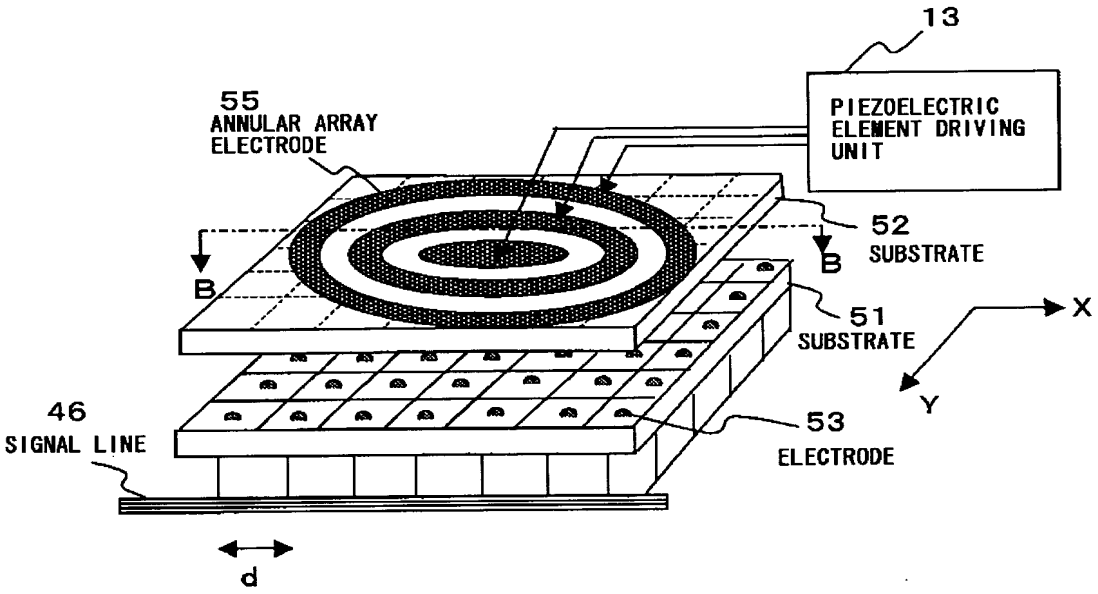
13
PIEZOELECTRIC ELEMENT DRIVING UNIT
55
ANNULAR ARRAY ELECTRODE
52
SUBSTRATE
B
B
51
SUBSTRATE
X
Y
46
SIGNAL LINE
53
ELECTRODE
d

FIG. 4A

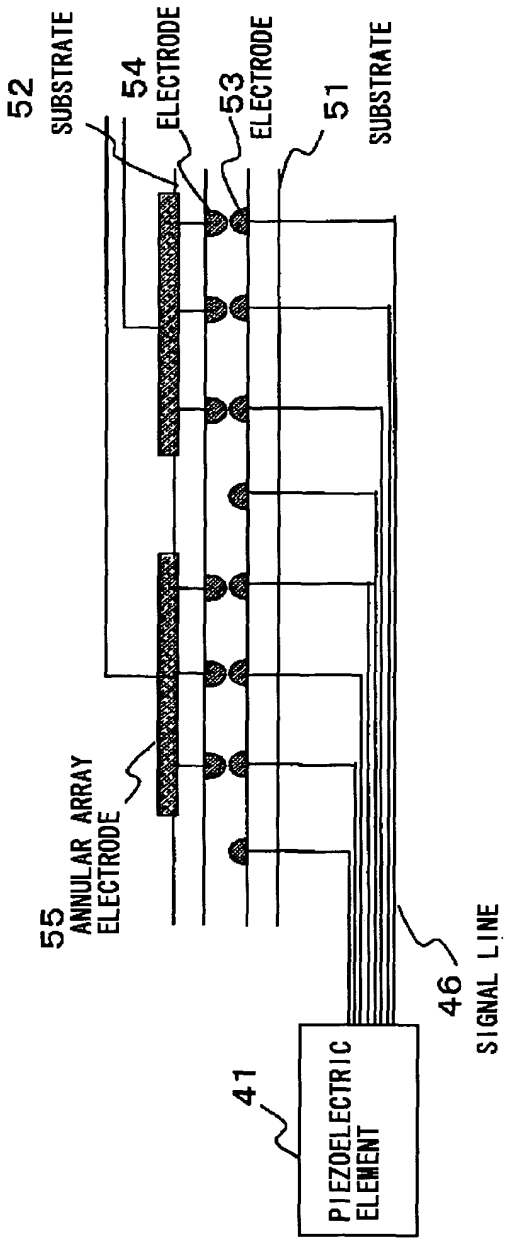
52
SUBSTRATE
54
ELECTRODE
53
ELECTRODE
51
SUBSTRATE
55
ANNULAR ARRAY
ELECTRODE
46
SIGNAL LINE
41
PIEZOELECTRIC
ELEMENT

FIG. 4B

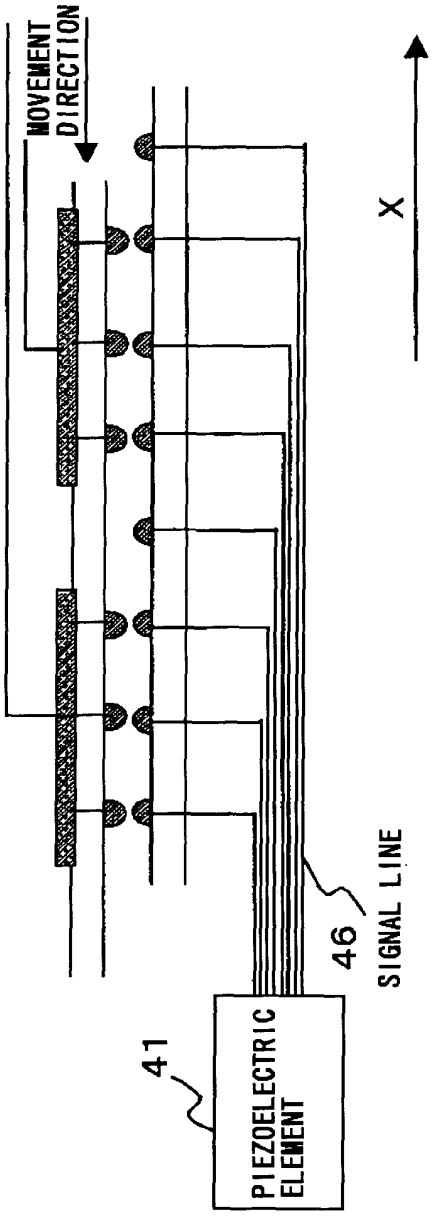
MOVEMENT DIRECTION
X
SIGNAL LINE
46
41
PIEZOELECTRIC ELEMENT

FIG. 4C

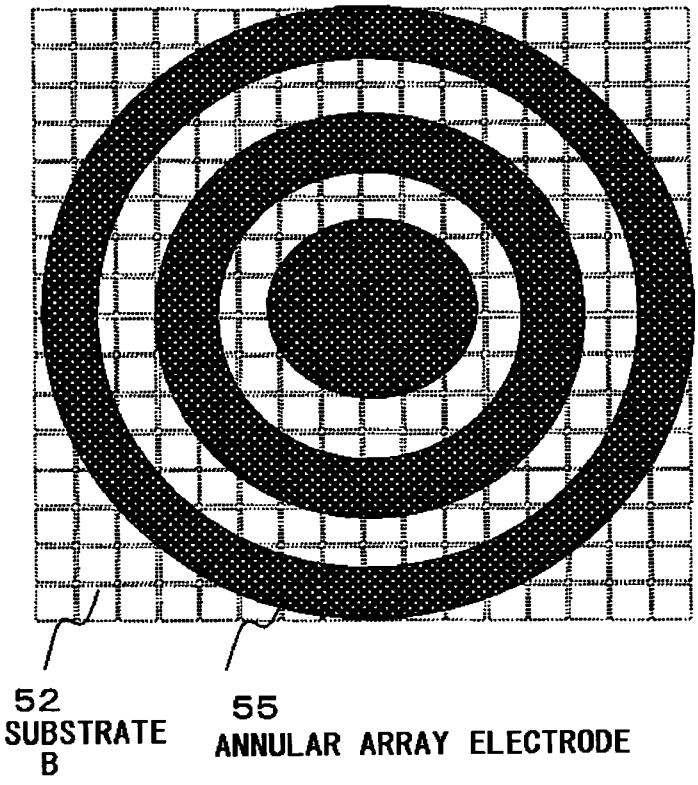

FIG. 5A

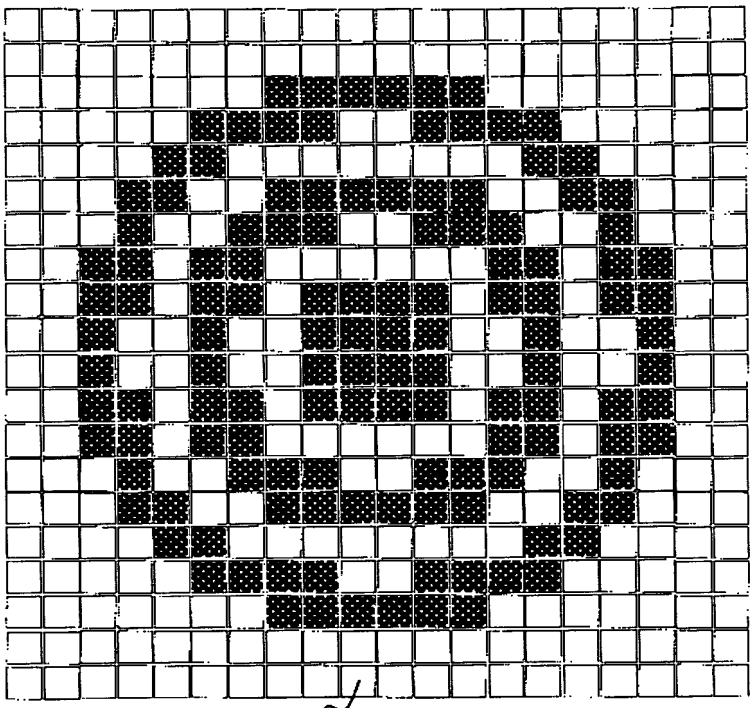

FIG. 5B

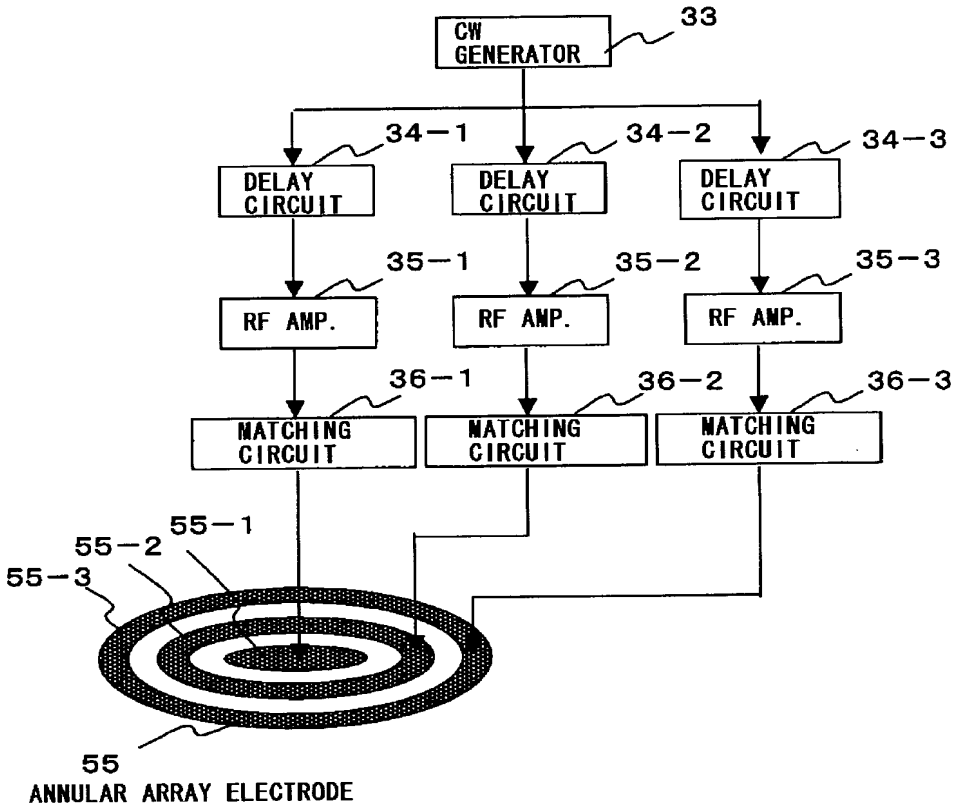
CW GENERATOR
33
34−1
34−2
34−3
DELAY CIRCUIT
DELAY CIRCUIT
DELAY CIRCUIT
35−1
35−2
35−3
RF AMP.
RF AMP.
RF AMP.
36−1
36−2
36−3
MATCHING CIRCUIT
MATCHING CIRCUIT
MATCHING CIRCUIT
55−1
55−2
55−3
55
ANNULAR ARRAY ELECTRODE

FIG. 6A

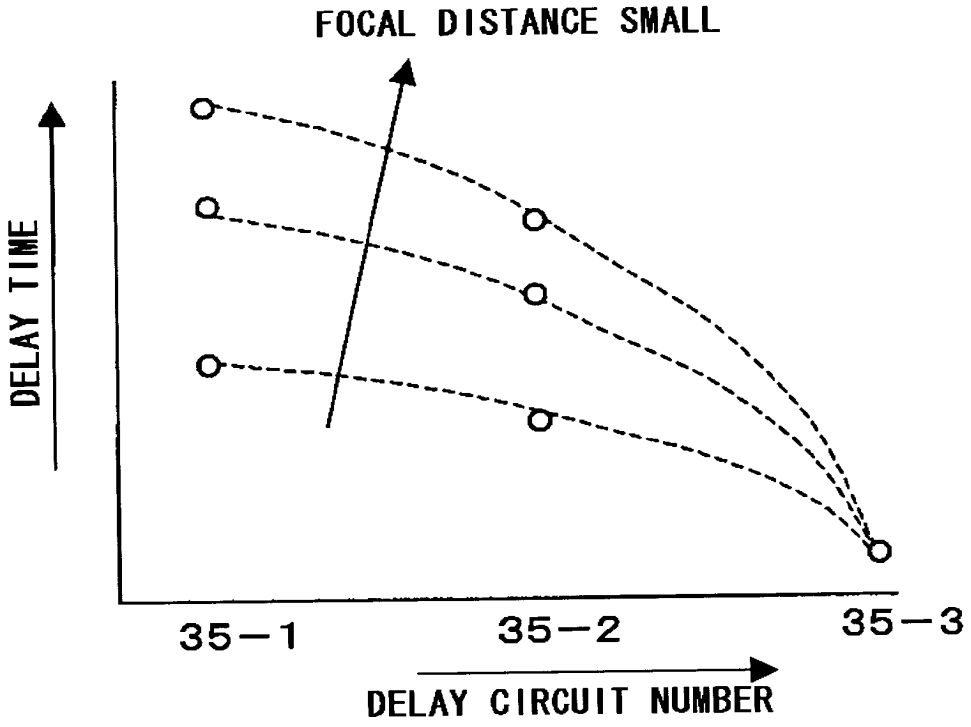
FOCAL DISTANCE SMALL
DELAY TIME
35−1
35−2
35−3
DELAY CIRCUIT NUMBER

FIG. 6B

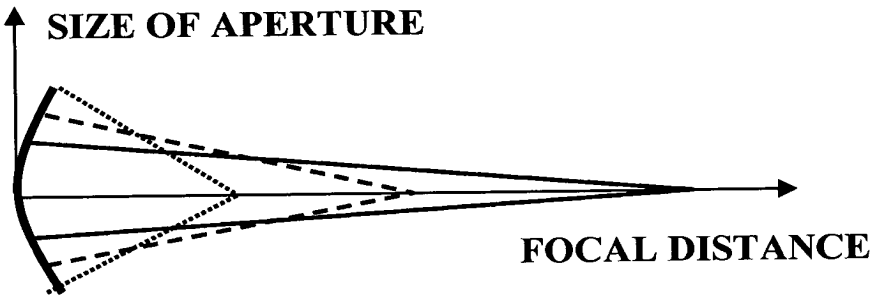

FIG. 7

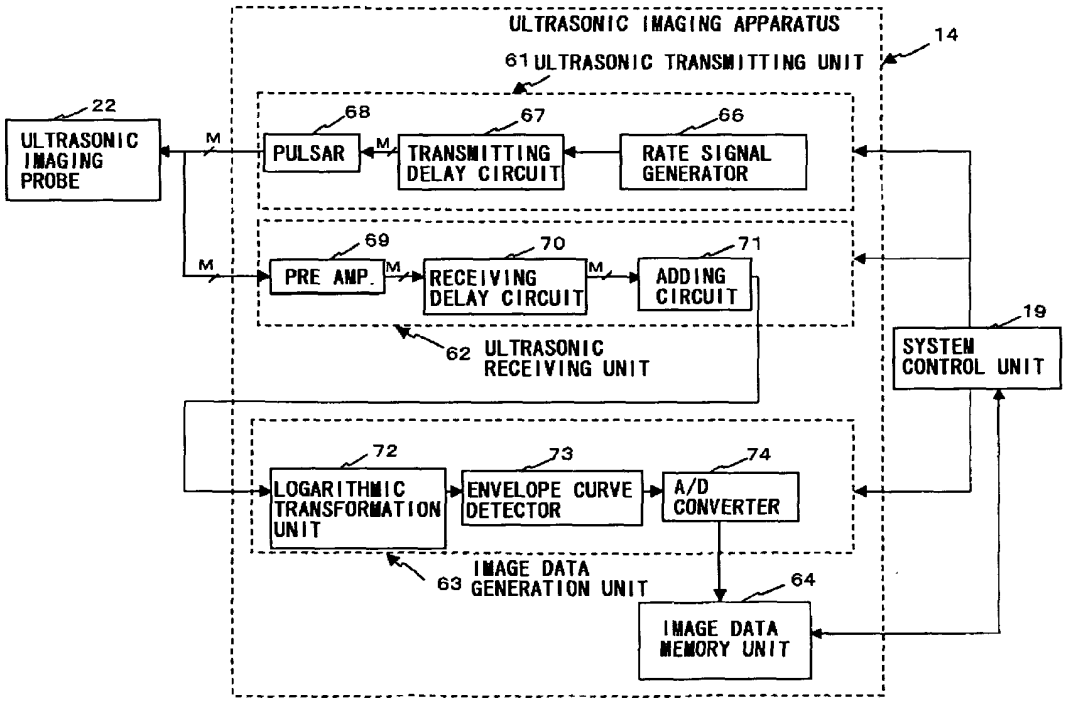
ULTRASONIC IMAGING APPARATUS
14
61 ULTRASONIC TRANSMITTING UNIT
22
ULTRASONIC IMAGING PROBE
M
68
PULSAR
M
67
TRANSMITTING DELAY CIRCUIT
66
RATE SIGNAL GENERATOR
M
69
PRE AMP.
M
70
RECEIVING DELAY CIRCUIT
M
71
ADDING CIRCUIT
62 ULTRASONIC RECEIVING UNIT
19
SYSTEM CONTROL UNIT
72
LOGARITHMIC TRANSFORMATION UNIT
73
ENVELOPE CURVE DETECTOR
74
A/D CONVERTER
63 IMAGE DATA GENERATION UNIT
64
IMAGE DATA MEMORY UNIT

FIG. 8

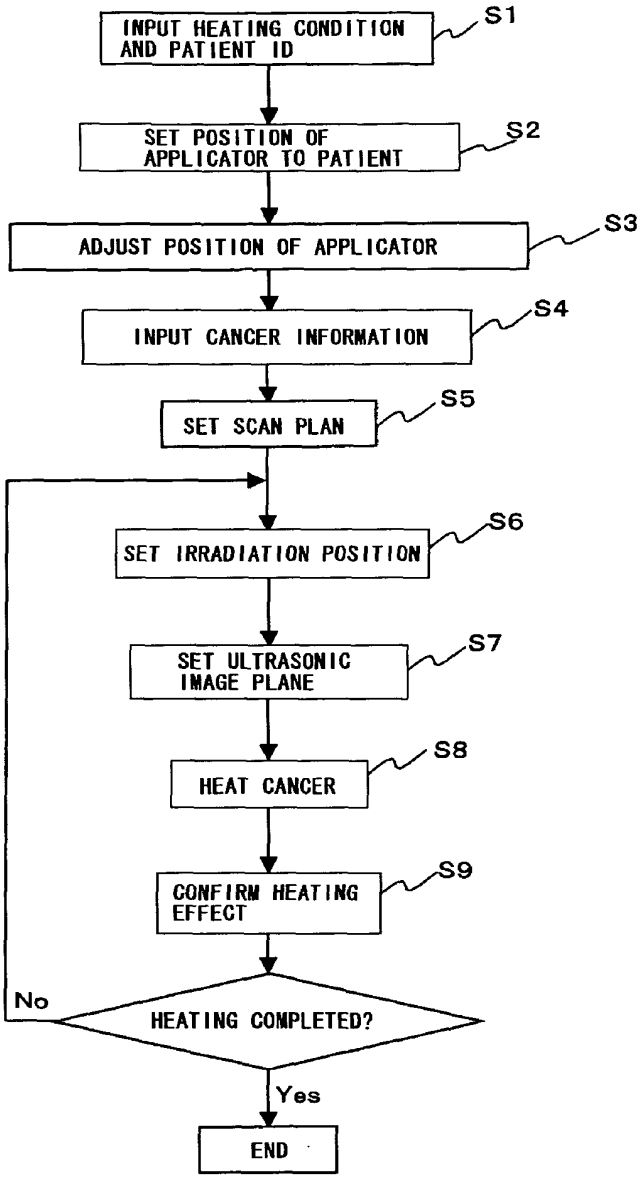
INPUT HEATING CONDITION AND PATIENT ID
S1
SET POSITION OF APPLICATOR TO PATIENT
S2
ADJUST POSITION OF APPLICATOR
S3
INPUT CANCER INFORMATION
S4
SET SCAN PLAN
S5
SET IRRADIATION POSITION
S6
SET ULTRASONIC IMAGE PLANE
S7
HEAT CANCER
S8
CONFIRM HEATING EFFECT
S9
HEATING COMPLETED?
No
Yes
END

FIG. 9

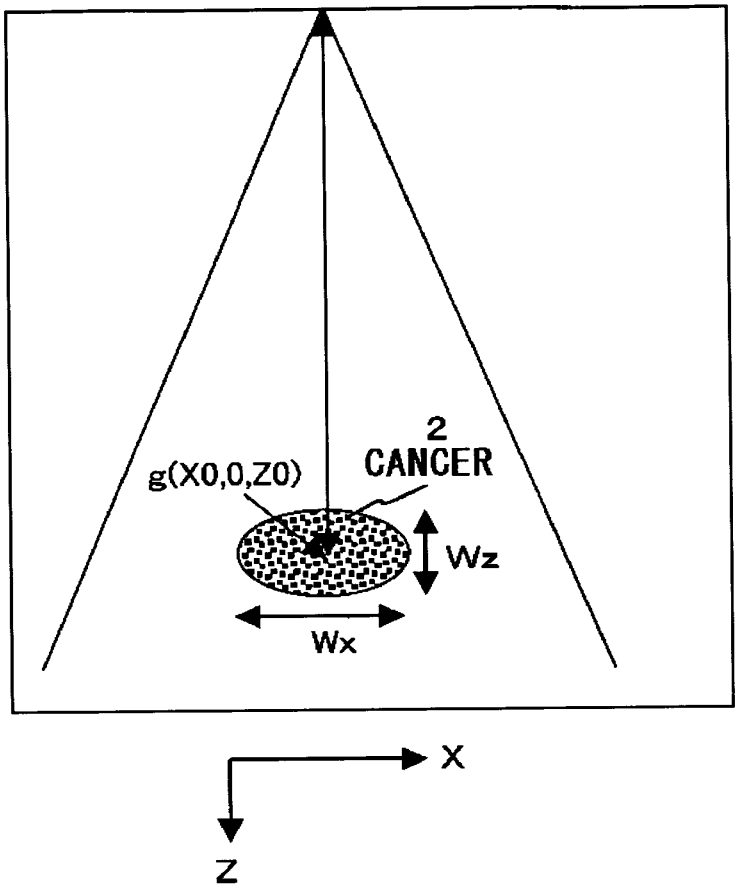

FIG. 10A

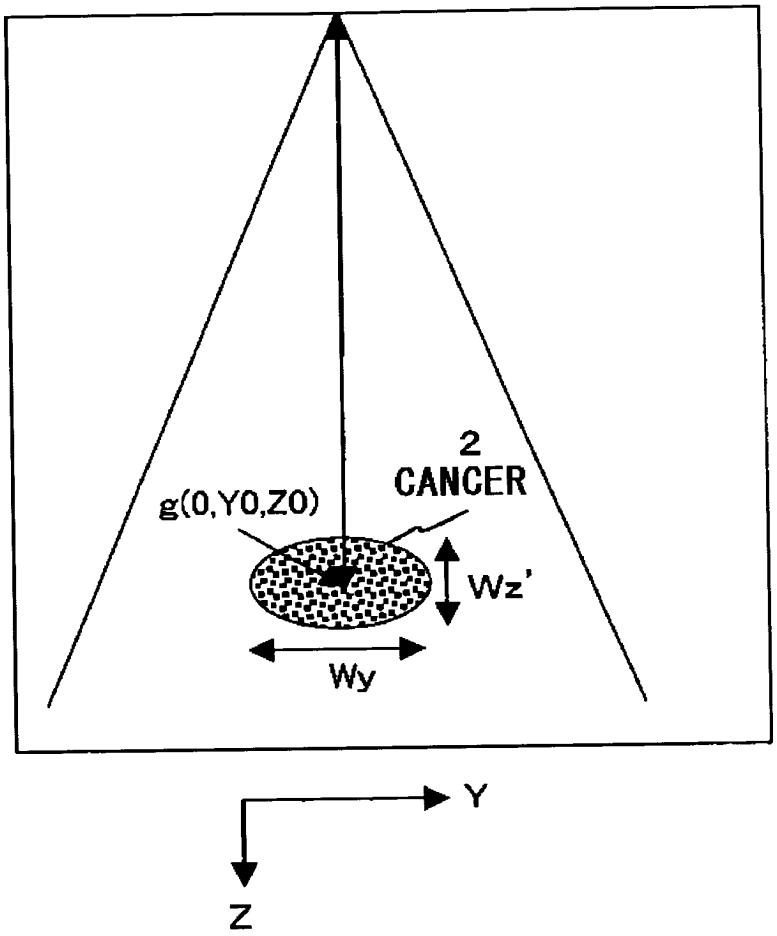

FIG. 10B

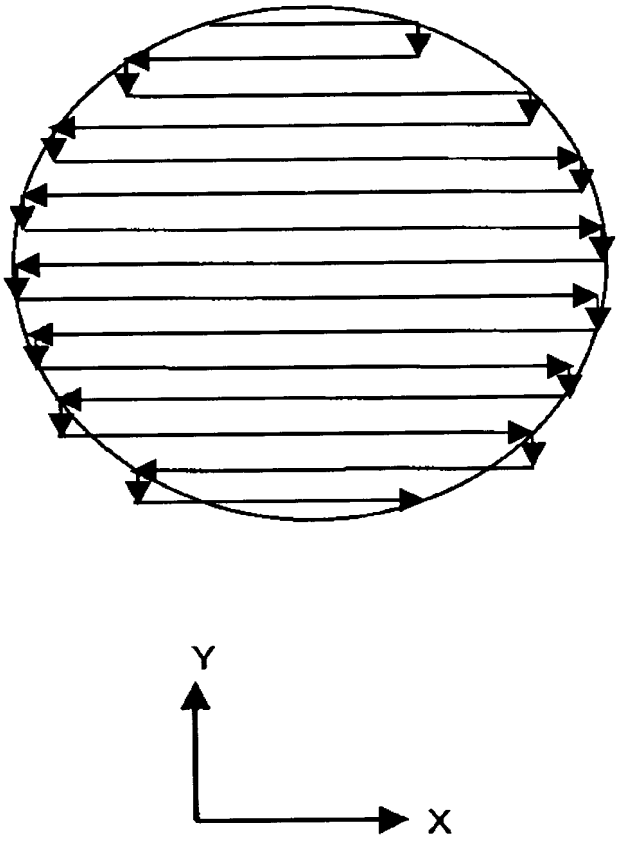

FIG. 11A

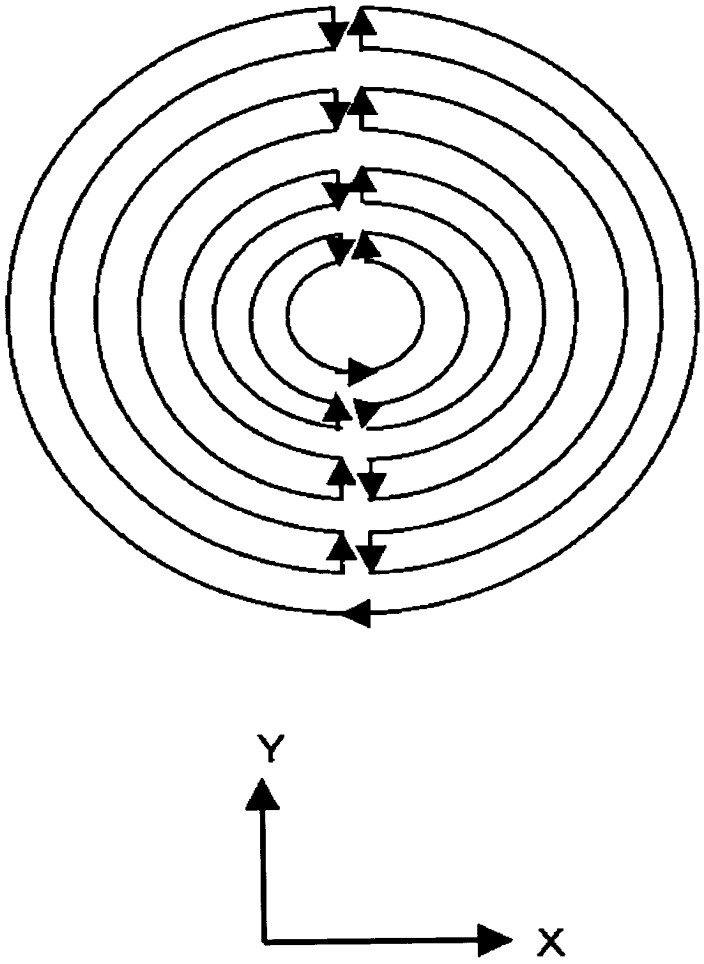

FIG. 11B

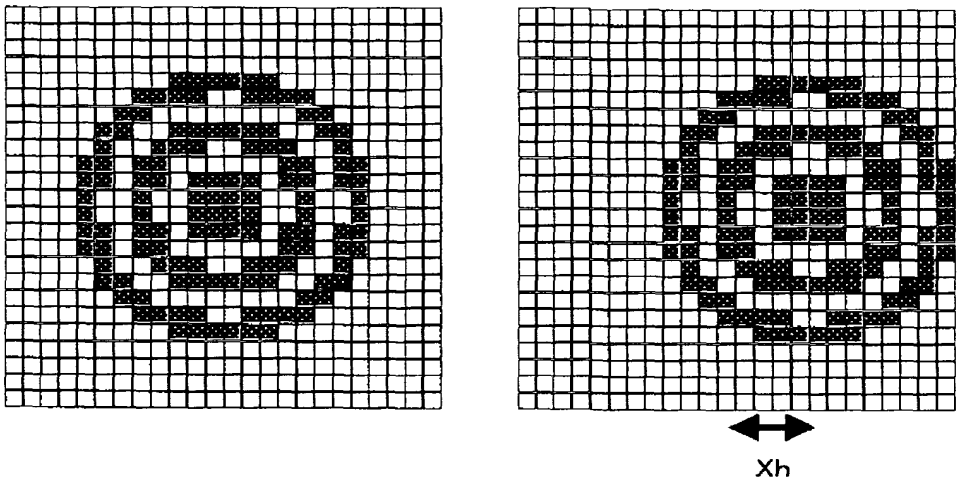

FIG. 12A

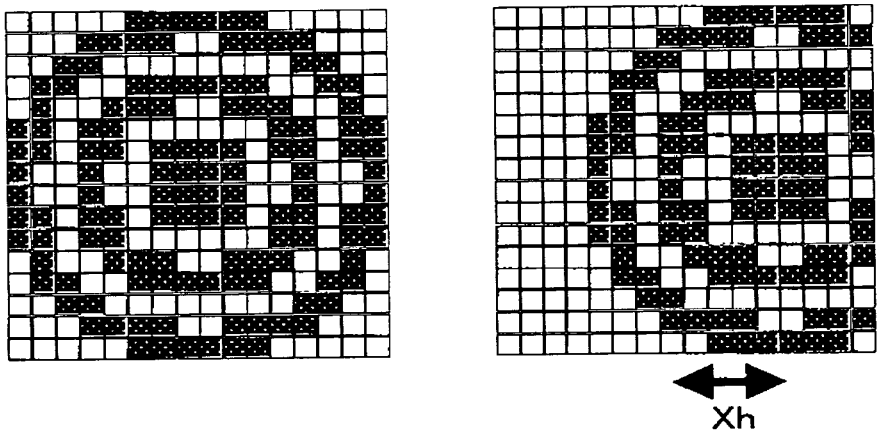

FIG. 12B

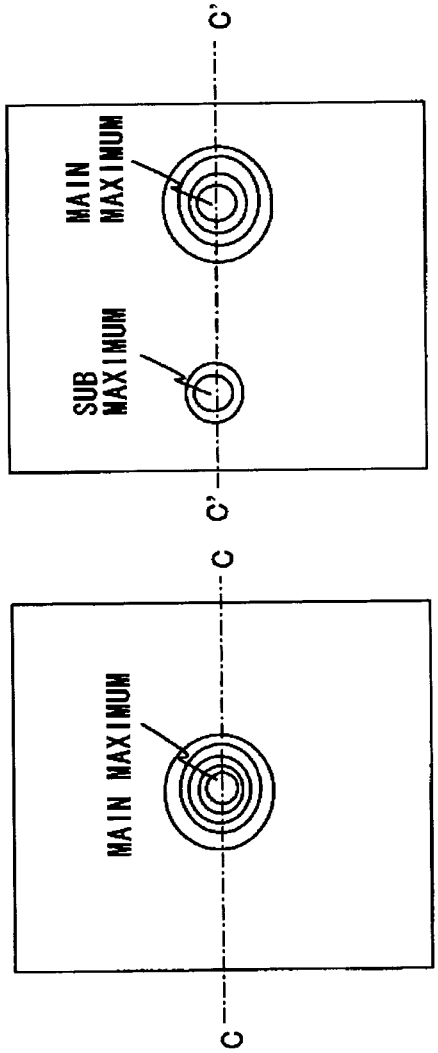

FIG. 13A

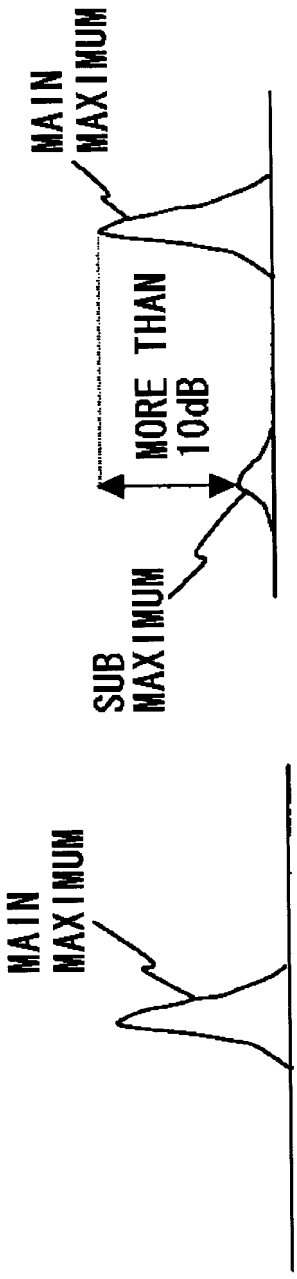

FIG. 13B

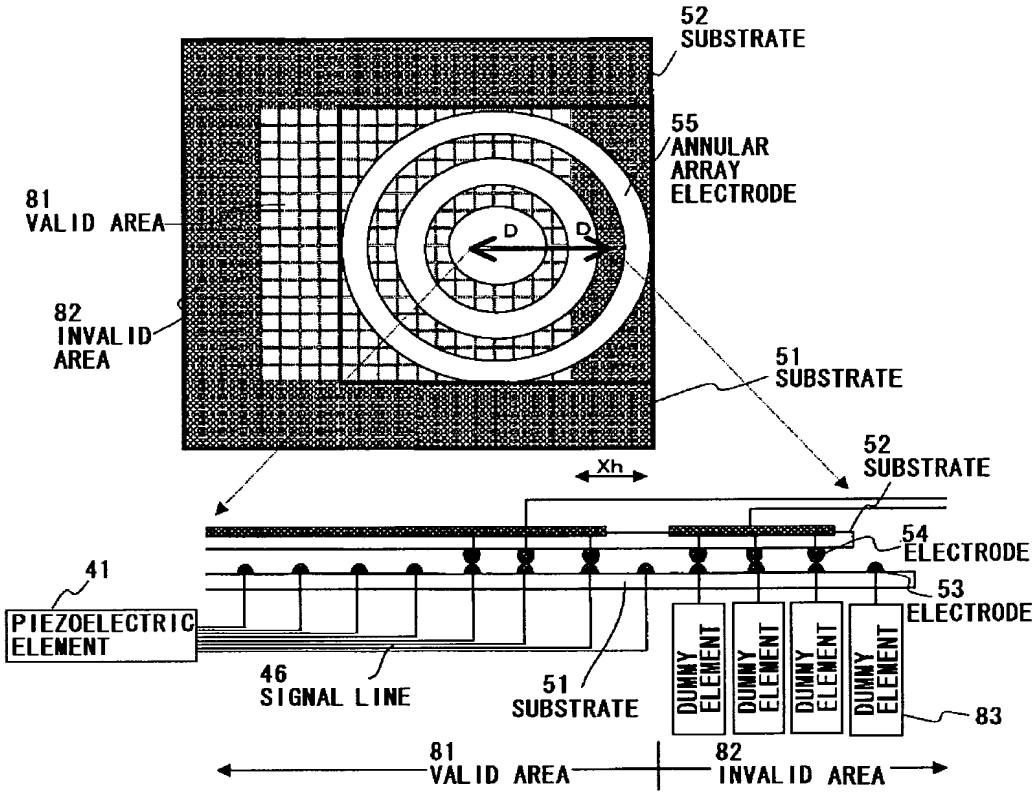
52
SUBSTRATE
55
ANNULAR
ARRAY
ELECTRODE
81
VALID AREA
D
D
82
INVALID
AREA
51
SUBSTRATE
52
SUBSTRATE
Xh
54
ELECTRODE
53
ELECTRODE
41
PIEZOELECTRIC
ELEMENT
46
SIGNAL LINE
51
SUBSTRATE
DUMMY
ELEMENT
DUMMY
ELEMENT
DUMMY
ELEMENT
DUMMY
ELEMENT
83
81
VALID AREA
82
INVALID AREA

FIG. 14

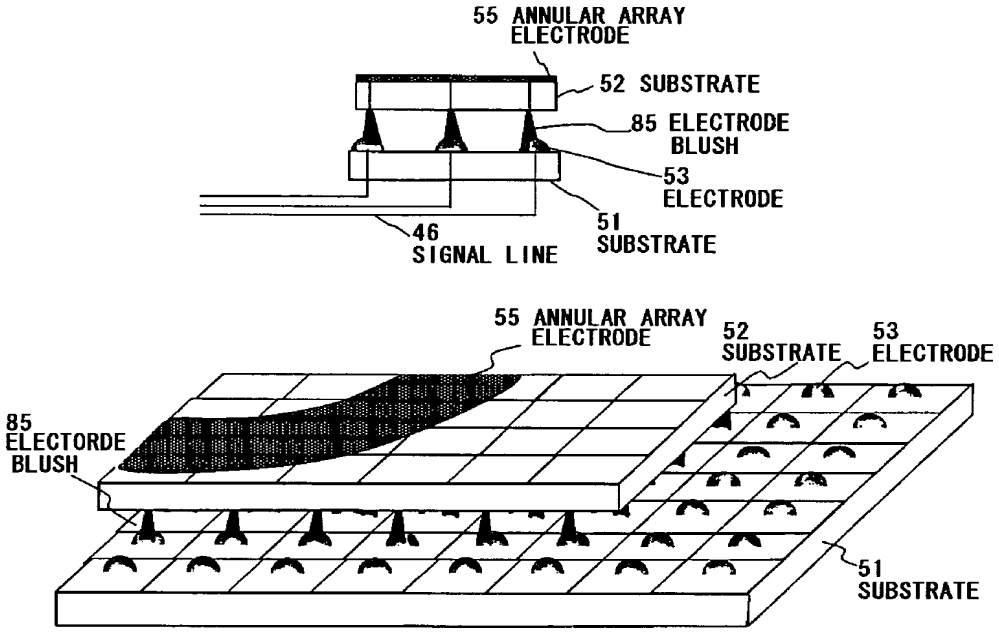
55 ANNULAR ARRAY ELECTRODE
52 SUBSTRATE
85 ELECTRODE BLUSH
53 ELECTRODE
46 SIGNAL LINE
51 SUBSTRATE
55 ANNULAR ARRAY ELECTRODE
52 SUBSTRATE
53 ELECTRODE
85 ELECTORDE BLUSH
51 SUBSTRATE

FIG. 15

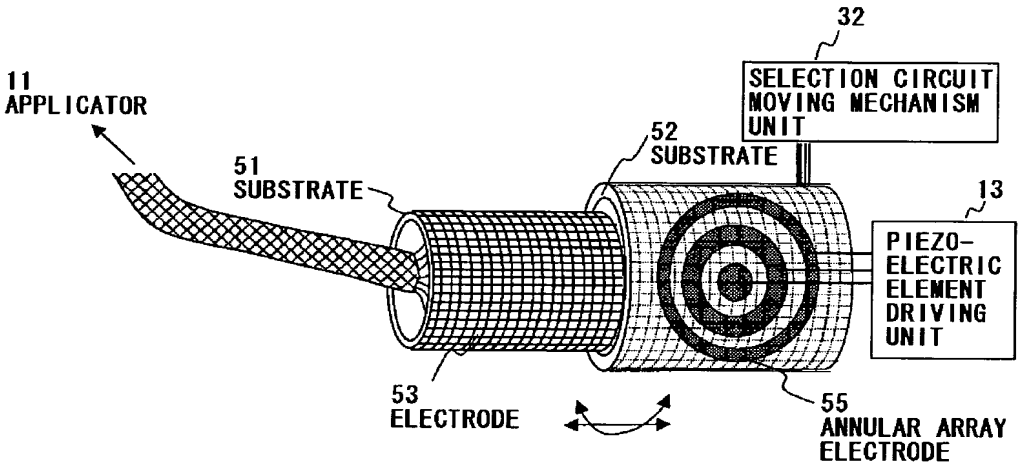
32
SELECTION CIRCUIT MOVING MECHANISM UNIT
11
APPLICATOR
52
SUBSTRATE
51
SUBSTRATE
13
PIEZO-ELECTRIC ELEMENT DRIVING UNIT
53
ELECTRODE
55
ANNULAR ARRAY ELECTRODE

FIG. 16

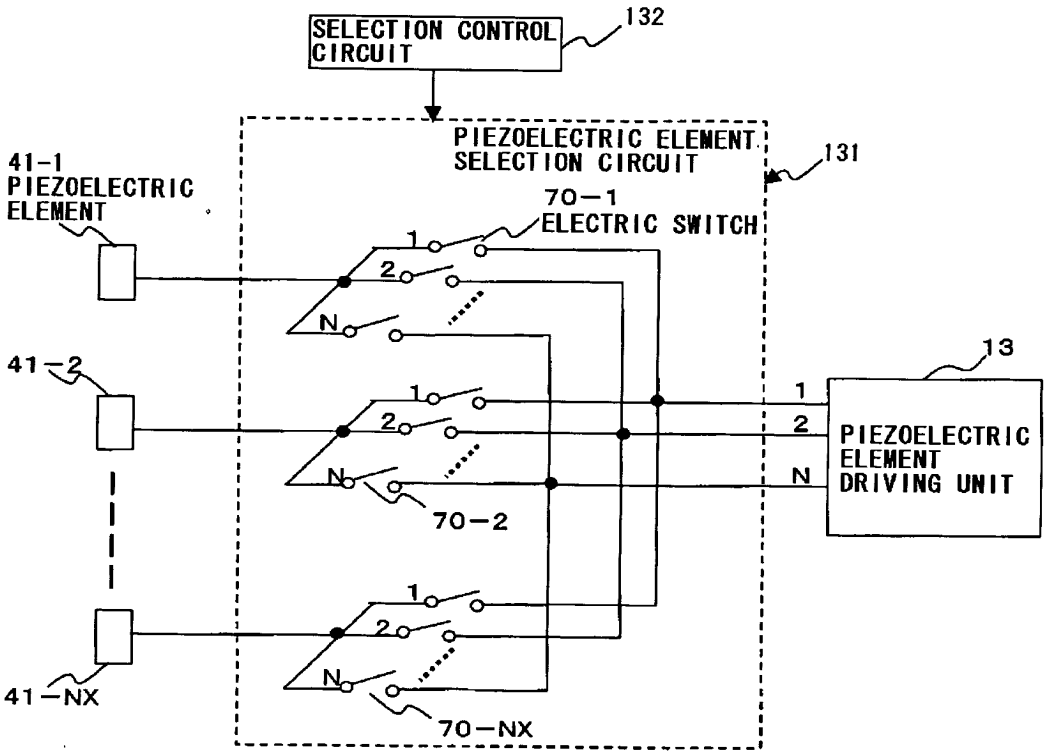
SELECTION CONTROL CIRCUIT
132
PIEZOELECTRIC ELEMENT SELECTION CIRCUIT
131
41-1 PIEZOELECTRIC ELEMENT
70-1 ELECTRIC SWITCH
1
2
N
41-2
70-2
41-NX
70-NX
13
PIEZOELECTRIC ELEMENT DRIVING UNIT

FIG.17

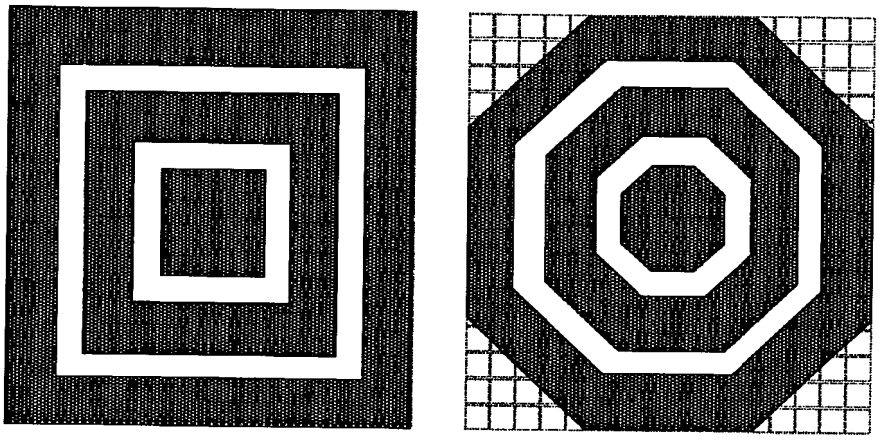

FIG. 18